

## TENT COOPERATION TRE

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

RUSKA & CO OY  
Runeberginkatu 5 A  
FIN-00100 Helsinki  
FINLANDE

Date of mailing (day/month/year) 14 January 2000 (14.01.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 302554/AR	
International application No. PCT/FI99/00569	International filing date (day/month/year) 28 June 1999 (28.06.99)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input type="checkbox"/> the inventor	<input type="checkbox"/> the agent <input type="checkbox"/> the common representative
Name and Address SUNDS DEFIBRATOR WOODHANDLING OY PL 210 FIN-28101 Pori Finland	State of Nationality FI	State of Residence FI
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name	<input type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence
Name and Address VALMET WOODHANDLING OY PL 210 FIN-28101 Pori Finland	State of Nationality FI	State of Residence FI
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input checked="" type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned	
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer S. De Michiel
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## TENT COOPERATION TRE Y

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

OY JALO ANT-WUORINEN AB  
Iso Roobertinkatu 4-6  
FIN-00120 Helsinki  
FINLANDEDate of mailing (day/month/year)  
10 November 2000 (10.11.00)Applicant's or agent's file reference  
302554/AR

## IMPORTANT NOTIFICATION

International application No.  
PCT/FI99/00569International filing date (day/month/year)  
28 June 1999 (28.06.99)

## 1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

## Name and Address

RUSKA & CO OY  
Runeberginkatu 5 A  
FIN-00100 Helsinki  
Finland

State of Nationality

State of Residence

Telephone No.

+358 9 694 9099

Facsimile No.

+358 9 694 9865

Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

## Name and Address

OY JALO ANT-WUORINEN AB  
Iso Roobertinkatu 4-6  
FIN-00120 Helsinki  
Finland

State of Nationality

State of Residence

Telephone No.

358 9 612 6120

Facsimile No.

358 9 640 575

Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned  
☐ the International Searching Authority ☒ the elected Offices concerned  
☒ the International Preliminary Examining Authority ☐ other:The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Authorized officer

Aino Metcalfe

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C. 20231  
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 08 March 2000 (08.03.00)	
International application No. PCT/FI99/00569	Applicant's or agent's file reference 302554/AR
International filing date (day/month/year) 28 June 1999 (28.06.99)	Priority date (day/month/year) 09 July 1998 (09.07.98)
Applicant TÄHKÄNEN, Hannu	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

12 January 2000 (12.01.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Claudio Borton

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 302554/AR	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/FI 99/00569	International filing date (day/month/year) 28 June 1999	(Earliest) Priority Date (day/month/year) 9 July 1998
Applicant Sunds Defibrator Woodhandling Oy et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
  - ☐ filed with the international application.
  - ☐ furnished by the applicant separately from the international application,
    - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
  - ☐ transcribed by this Authority.
4. With regard to the title, ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,
  - ☒ the text is approved as submitted by the applicant.
  - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:  
Figure No. 3 ☒ as suggested by the applicant. ☐ None of the figures.  
☐ because the applicant failed to suggest a figure.  
☐ because this figure better characterizes the invention.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/00569

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B07B 9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B07B, D21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5232097 A (ANTTI TOHKALA), 3 August 1993 (03.08.93), column 3, line 41 - column 4, line 13 --	1-6
A	WO 8402093 A1 (WEYERHAEUSER COMPANY), 7 June 1984 (07.06.84), abstract -- -----	1-6



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

1 November 1999

Date of mailing of the international search report

05-11-1999

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Ulla Granlund/ELY  
Telephone No. +46 8 782 25 00

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

28/09/99

International application No.

PCT/FI 99/00569

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5232097 A	03/08/93	CA 2084375 A	11/06/93
		FI 90019 B,C	15/09/93
		FI 915803 A	11/06/93
WO 8402093 A1	07/06/84	AU 1100483 A	18/06/84
		EP 0126068 A	28/11/84

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

28/09/99

International application No.  
PCT/FI 99/00569

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5232097 A	03/08/93	CA 2084375 A	11/06/93
		FI 90019 B,C	15/09/93
		FI 915803 A	11/06/93
WO 8402093 A1	07/06/84	AU 1100483 A	18/06/84
		EP 0126068 A	28/11/84

REC'D 06 NOV 2000

WIPO

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 302554	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/FI99/00569	International filing date (day/month/year) 28.06.1999	Priority date (day/month/year) 09.07.1998
International Patent Classification (IPC) or national classification and IPC <sup>7</sup> B07B 9/00		
Applicant VALMET WOODHANDLING OY et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of \_\_\_\_\_ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  12.01.2000	Date of completion of this report  27.10.2000
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer,  Ulla Granlund/MP Telephone No. 08-782 25 00



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FI99/00569

## I. Basis of the report

1. This report has been drawn on the basis of *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

☒ the international application as originally filed.

☐ the description, pages \_\_\_\_\_, as originally filed,  
 pages \_\_\_\_\_, filed with the demand,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☐ the claims, Nos. \_\_\_\_\_, as originally filed,  
 Nos. \_\_\_\_\_, as amended under Article 19,  
 Nos. \_\_\_\_\_, filed with the demand,  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 Nos. \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

☐ the drawings, sheets/fig \_\_\_\_\_, as originally filed,  
 sheets/fig \_\_\_\_\_, filed with the demand  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☐ the claims, Nos. \_\_\_\_\_

☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/FI99/00569

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	<u>1-6</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-6</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-6</u>	YES
	Claims		NO

### 2. Citations and explanations

The claimed invention relates to a wood chip screening method and plant, and especially to the removal of pin chips. The invention is intended to solve problems regarding high content of pin chips in subsequent pulp making processes.

US A 5232097 (column 3 line 41 - column 4 line 13), which represents to closest prior art, discloses a screening method and apparatus for sorting wood chips into three categories.

However, the cited document does not reveal that the pin chips are separated in the screening process. A desired amount is dosed back among the chips due for the pulp making process, immediately after the separation.

Therefore, the claimed invention as stated in claims 1-6 is novel. It is further considered to involve an inventive step as the screening can be optimised because a desired amount of pin chips are led to a subsequent process without intermediate storage. It is further considered to be industrially applicable.

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. Full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/

**PCT**

**CHAPTER II**

**DEMAND**

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA		Date of receipt of DEMAND	
<b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>		Applicant's or agent's file reference 302554	
International application No. PCT/FI99/00569	International filing date (day/month/year) 28 June 1999 (28.06.99)	(Earliest) Priority date (day/month/year) 09 July 1998 (09.07.98)	
Title of invention A CHIP SCREENING METHOD AND PLANT			
<b>Box No. II APPLICANT(S)</b>			
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) VALMET WOODHANDLING OY P.O.Box 210 FIN-28101 Finland		Telephone No.:	
		Facsimile No.:	
		Teleprinter No.:	
State (that is, country) of nationality: FI		State (that is, country) of residence: FI	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) TÄHKÄNEN, Hannu Vinkkelikuja 32 FIN-26660 RAUMA Finland			
State (that is, country) of nationality: FI		State (that is, country) of residence: FI	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)			
State (that is, country) of nationality:		State (that is, country) of residence:	
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.			

**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The following person is ☒ agent ☐ common representative

and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.

☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

RUSKA & Co Oy  
Runeberginkatu 5  
FIN-00100 HELSINKI  
Finland

Telephone No.:

+358 9 694 9099

Facsimile No.:

+358 9 694 9865

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**
**Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description ☐ as originally filed

☐ as amended under Article 34

the claims ☐ as originally filed

☐ as amended under Article 19 (together with any accompanying statement)

☐ as amended under Article 34

the drawings ☐ as originally filed

☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: english
☐ which is the language in which the international application was filed.

☒ which is the language of a translation furnished for the purposes of international search.

☐ which is the language of publication of the international application.

☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

**Box No. V ELECTION OF STATES**

The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

**Box No. VI CHECK LIST**

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- |  |   |        |
|--|---|--------|
| 1. translation of international application                              | : | sheets |
| 2. amendments under Article 34   | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19  | : | sheets |
| 5. letter  | : | sheets |
| 6. other ( <i>specify</i> )  | : | sheets |

For International Preliminary  
Examining Authority use only

received not received

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

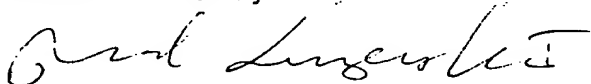
The demand is also accompanied by the item(s) marked below:

- |  |   |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet                             | 4. <input type="checkbox"/> statement explaining lack of signature                                  |
| 2. <input type="checkbox"/> separate signed power of attorney                            | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input checked="" type="checkbox"/> other ( <i>specify</i> ): a copy of our letter to WIPO       |

**Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

RUSKA & Co Oy



Tord Langenskiöld  
Patent Agent

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

## PCT

## FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

<p>International application No. <b>PCT/FI99/00569</b></p> <p>Applicant's or agent's file reference <b>302554</b></p> <p><b>Applicant</b> <b>VALMET WOODHANDLING OY et al.</b></p> <p><b>Calculation of prescribed fees</b></p> <p>1. Preliminary examination fee ..... <b>SEK 4200</b> <b>P</b></p> <p>2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i> ..... <b>SEK 1270</b> <b>H</b></p> <p>3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box ..... <b>SEK 5470</b> <b>TOTAL</b></p> <p><b>Mode of Payment</b></p> <table style="width: 100%;"> <tr> <td><input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)</td> <td><input type="checkbox"/> cash</td> </tr> <tr> <td><input type="checkbox"/> cheque</td> <td><input type="checkbox"/> revenue stamps</td> </tr> <tr> <td><input type="checkbox"/> postal money order</td> <td><input type="checkbox"/> coupons</td> </tr> <tr> <td><input type="checkbox"/> bank draft</td> <td><input checked="" type="checkbox"/> other (specify): <b>postal giro</b> <b>account no. 156 84-4</b></td> </tr> </table> <p><b>Deposit Account Authorization</b> <i>(this mode of payment may not be available at all IPEAs)</i></p> <p>The IPEA/ _____ <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.</p> <p><input type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.</p> <p>Deposit Account Number _____ Date (day/month/year) _____ Signature _____</p>	<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash	<input type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps	<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons	<input type="checkbox"/> bank draft	<input checked="" type="checkbox"/> other (specify): <b>postal giro</b> <b>account no. 156 84-4</b>	<p>For International Preliminary Examining Authority use only</p> <p>Date stamp of the IPEA</p>
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash								
<input type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps								
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons								
<input type="checkbox"/> bank draft	<input checked="" type="checkbox"/> other (specify): <b>postal giro</b> <b>account no. 156 84-4</b>								

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum)

Box No. I TITLE OF INVENTION

A CHIP SCREENING METHOD AND PLANT

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SUNDS DEFIBRATOR WOODHANDLING OY  
PL 210  
FIN-28101 PORI  
Finland

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:  
FI

State (that is, country) of residence:  
FI

This person is applicant for the purposes of:

☐ all designated States

☒ all designated States except the United States of America

☐ the United States of America only

☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

TÄHKÄNEN Hannu  
Vinkkelikuja 32  
FIN-26660 RAUMA  
Finland

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:  
FI

State (that is, country) of residence:  
FI

This person is applicant for the purposes of:

☐ all designated States

☐ all designated States except the United States of America

☒ the United States of America only

☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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Runeberginkatu 5 A  
FIN-00100 HELSINKI  
Finland

Telephone No.

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Facsimile No.

+358 9 694 9865

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No.V DESIGNATIONS STATES**

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

**Regional Patent**

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**

- |  |  |
|--|--|
| <input type="checkbox"/> <b>AL</b> Albania .....                               | <input type="checkbox"/> <b>LS</b> Lesotho .....                                   |
| <input type="checkbox"/> <b>AM</b> Armenia .....                               | <input type="checkbox"/> <b>LT</b> Lithuania .....                                 |
| <input type="checkbox"/> <b>AT</b> Austria .....                               | <input type="checkbox"/> <b>LU</b> Luxembourg .....                                |
| <input type="checkbox"/> <b>AU</b> Australia .....                             | <input type="checkbox"/> <b>LV</b> Latvia .....                                    |
| <input type="checkbox"/> <b>AZ</b> Azerbaijan .....                            | <input type="checkbox"/> <b>MD</b> Republic of Moldova .....                       |
| <input type="checkbox"/> <b>BA</b> Bosnia and Herzegovina .....                | <input type="checkbox"/> <b>MG</b> Madagascar .....                                |
| <input type="checkbox"/> <b>BB</b> Barbados .....                              | <input type="checkbox"/> <b>MK</b> The former Yugoslav Republic of Macedonia ..... |
| <input type="checkbox"/> <b>BG</b> Bulgaria .....                              | <input type="checkbox"/> <b>MN</b> Mongolia .....                                  |
| <input type="checkbox"/> <b>BR</b> Brazil .....                                | <input type="checkbox"/> <b>MW</b> Malawi .....                                    |
| <input type="checkbox"/> <b>BY</b> Belarus .....                               | <input type="checkbox"/> <b>MX</b> Mexico .....                                    |
| <input checked="" type="checkbox"/> <b>CA</b> Canada .....                     | <input type="checkbox"/> <b>NO</b> Norway .....                                    |
| <input type="checkbox"/> <b>CH and LI</b> Switzerland and Liechtenstein .....  | <input type="checkbox"/> <b>NZ</b> New Zealand .....                               |
| <input type="checkbox"/> <b>CN</b> China .....                                 | <input type="checkbox"/> <b>PL</b> Poland .....                                    |
| <input type="checkbox"/> <b>CU</b> Cuba .....                                  | <input type="checkbox"/> <b>PT</b> Portugal .....                                  |
| <input type="checkbox"/> <b>CZ</b> Czech Republic .....                        | <input type="checkbox"/> <b>RO</b> Romania .....                                   |
| <input type="checkbox"/> <b>DE</b> Germany .....                               | <input type="checkbox"/> <b>RU</b> Russian Federation .....                        |
| <input type="checkbox"/> <b>DK</b> Denmark .....                               | <input type="checkbox"/> <b>SD</b> Sudan .....                                     |
| <input type="checkbox"/> <b>EE</b> Estonia .....                               | <input type="checkbox"/> <b>SE</b> Sweden .....                                    |
| <input type="checkbox"/> <b>ES</b> Spain .....                                 | <input type="checkbox"/> <b>SG</b> Singapore .....                                 |
| <input type="checkbox"/> <b>FI</b> Finland .....                               | <input type="checkbox"/> <b>SI</b> Slovenia .....                                  |
| <input type="checkbox"/> <b>GB</b> United Kingdom .....                        | <input type="checkbox"/> <b>SK</b> Slovakia .....                                  |
| <input type="checkbox"/> <b>GD</b> Grenada .....                               | <input type="checkbox"/> <b>SL</b> Sierra Leone .....                              |
| <input type="checkbox"/> <b>GE</b> Georgia .....                               | <input type="checkbox"/> <b>TJ</b> Tajikistan .....                                |
| <input type="checkbox"/> <b>GH</b> Ghana .....                                 | <input type="checkbox"/> <b>TM</b> Turkmenistan .....                              |
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| <input type="checkbox"/> <b>HR</b> Croatia .....                               | <input type="checkbox"/> <b>TT</b> Trinidad and Tobago .....                       |
| <input type="checkbox"/> <b>HU</b> Hungary .....                               | <input type="checkbox"/> <b>UA</b> Ukraine .....                                   |
| <input checked="" type="checkbox"/> <b>ID</b> Indonesia .....                  | <input checked="" type="checkbox"/> <b>UG</b> Uganda .....                         |
| <input type="checkbox"/> <b>IL</b> Israel .....                                | <input type="checkbox"/> <b>US</b> United States of America .....                  |
| <input type="checkbox"/> <b>IN</b> India .....                                 | <input type="checkbox"/> <b>UZ</b> Uzbekistan .....                                |
| <input type="checkbox"/> <b>IS</b> Iceland .....                               | <input type="checkbox"/> <b>VN</b> Viet Nam .....                                  |
| <input type="checkbox"/> <b>JP</b> Japan .....                                 | <input type="checkbox"/> <b>YU</b> Yugoslavia .....                                |
| <input type="checkbox"/> <b>KE</b> Kenya .....                                 | <input type="checkbox"/> <b>ZW</b> Zimbabwe .....                                  |
| <input type="checkbox"/> <b>KG</b> Kyrgyzstan .....                            |  |
| <input type="checkbox"/> <b>KP</b> Democratic People's Republic of Korea ..... |  |
| <input type="checkbox"/> <b>KR</b> Republic of Korea .....                     |  |
| <input type="checkbox"/> <b>KZ</b> Kazakhstan .....                            |  |
| <input type="checkbox"/> <b>LC</b> Saint Lucia .....                           |  |
| <input type="checkbox"/> <b>LK</b> Sri Lanka .....                             |  |
| <input type="checkbox"/> <b>LR</b> Liberia .....                               |  |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ .....
- ☐ .....
- ☐ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)



<b>Box No. VI PRIORITY CLAIM</b>		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 9 July 1998 (9.7.1998)	981578	FI		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): ( 1 )

\* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

### Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / SE

Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day/month/year)

Number

Country (or regional Office)

### Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 3

description (excluding sequence listing part) : 3

claims : 1

abstract : 1

drawings : 7

sequence listing part of description : \_\_\_\_\_

Total number of sheets : 15

This international application is accompanied by the item(s) marked below:

1. ☒ fee calculation sheet
2. ☐ separate signed power of attorney
3. ☐ copy of general power of attorney; reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☒ other (specify): a copy of FI search report

Figure of the drawings which should accompany the abstract: 3

Language of filing of the international application: finnish

### Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

RUSKA & Co Oy

Tord Langenskiöld  
Patent Agent

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings:  <input type="checkbox"/> received:  <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

# PCT

## FEE CALCULATION SHEET

### Annex to the Request

For receiving Office use only

International application No.

Date stamp of the receiving Office

Applicant's or agent's  
file reference

302554/AR

Applicant

SUNDS DEFIBRATOR WOODHANDLING OY

#### CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE . . . . . 800 T

2. SEARCH FEE . . . . . 4200 S

International search to be carried out by Swedish Patent Office  
(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

#### 3. INTERNATIONAL FEE

##### Basic Fee

The international application contains 15 sheets.

first 30 sheets . . . . . 2400 b1

x . . . . . = b2

remaining sheets additional amount

Add amounts entered at b1 and b2 and enter total at B . . . . . 2400 B

##### Designation Fees

The international application contains 4 designations.

4 x 550 = 2200 D

number of designation fees payable (maximum 10) amount of designation fee

Add amounts entered at B and D and enter total at I . . . . . 4600 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D.)

4. FEE FOR PRIORITY DOCUMENT (if applicable) . . . . . 122 P

5. TOTAL FEES PAYABLE . . . . . 9722

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

TOTAL

☐ The designation fees are not paid at this time.

#### MODE OF PAYMENT

☐ authorization to charge  
deposit account (see below)

☒ cheque

☐ postal money order

☐ bank draft

☐ cash

☐ revenue stamps

☐ coupons

☐ other (specify):

#### DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☐ (this check-box may be marked only if the conditions for deposit accounts of the receiving Office so permit) is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

Deposit Account No.

Date (day/month/year)

Signature

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>302554/AR</b>	<b>FOR FURTHER ACTION</b>	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. <b>PCT/FI 99/00569</b>	International filing date (day/month/year) <b>28 June 1999</b>	(Earliest) Priority Date (day/month/year) <b>9 July 1998</b>
Applicant <b>Sunds Defibrator Woodhandling Oy et al</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing
  - ☐ filed with the international application.
  - ☐ furnished by the applicant separately from the international application,
    - ☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
  - ☐ transcribed by this Authority.
4. With regard to the title, ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:
5. With regard to the abstract,
  - ☒ the text is approved as submitted by the applicant.
  - ☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:  
Figure No. 3 ☒ as suggested by the applicant. ☐ None of the figures.  
☐ because the applicant failed to suggest a figure.  
☐ because this figure better characterizes the invention.

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

receiving Office use only

International Application No. **PCT/FI 99 / 0 0 5 6 9**

International Filing Date **28 JUN 1999 (28.06.99)**

The Finnish Patent Office  
PCT International Application  
Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) **302554/AR<sup>4</sup>**

RO/FI

### Box No. I TITLE OF INVENTION

A CHIP SCREENING METHOD AND PLANT

### Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

SUNDS DEFIBRATOR WOODHANDLING OY  
PL 210  
FIN-28101 PORI  
Finland

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

FI

State (that is, country) of residence:

FI

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

### Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

TÄHKÄNEN Hannu  
Vinkkelikuja 32  
FIN-26660 RAUMA  
Finland

This person is:

☐

applicant only

☒

applicant and inventor

☐

inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

FI

State (that is, country) of residence:

FI

This person is applicant for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

### Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

RUSKA & Co Oy  
Runeberginkatu 5 A  
FIN-00100 HELSINKI  
Finland

Telephone No.

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☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No.V DESIGNATION STATES**

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

**Regional Patent**

- ☐ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA** OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line) .....

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**

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| <input type="checkbox"/> <b>AL</b> Albania .....                               | <input type="checkbox"/> <b>LS</b> Lesotho .....                                   |
| <input type="checkbox"/> <b>AM</b> Armenia .....                               | <input type="checkbox"/> <b>LT</b> Lithuania .....                                 |
| <input type="checkbox"/> <b>AT</b> Austria .....                               | <input type="checkbox"/> <b>LU</b> Luxembourg .....                                |
| <input type="checkbox"/> <b>AU</b> Australia .....                             | <input type="checkbox"/> <b>LV</b> Latvia .....                                    |
| <input type="checkbox"/> <b>AZ</b> Azerbaijan .....                            | <input type="checkbox"/> <b>MD</b> Republic of Moldova .....                       |
| <input type="checkbox"/> <b>BA</b> Bosnia and Herzegovina .....                | <input type="checkbox"/> <b>MG</b> Madagascar .....                                |
| <input type="checkbox"/> <b>BB</b> Barbados .....                              | <input type="checkbox"/> <b>MK</b> The former Yugoslav Republic of Macedonia ..... |
| <input type="checkbox"/> <b>BG</b> Bulgaria .....                              | <input type="checkbox"/> <b>MN</b> Mongolia .....                                  |
| <input type="checkbox"/> <b>BR</b> Brazil .....                                | <input type="checkbox"/> <b>MW</b> Malawi .....                                    |
| <input type="checkbox"/> <b>BY</b> Belarus .....                               | <input type="checkbox"/> <b>MX</b> Mexico .....                                    |
| <input checked="" type="checkbox"/> <b>CA</b> Canada .....                     | <input type="checkbox"/> <b>NO</b> Norway .....                                    |
| <input type="checkbox"/> <b>CH and LI</b> Switzerland and Liechtenstein .....  | <input type="checkbox"/> <b>NZ</b> New Zealand .....                               |
| <input type="checkbox"/> <b>CN</b> China .....                                 | <input type="checkbox"/> <b>PL</b> Poland .....                                    |
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| <input type="checkbox"/> <b>DK</b> Denmark .....                               | <input type="checkbox"/> <b>SD</b> Sudan .....                                     |
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| <input type="checkbox"/> <b>GD</b> Grenada .....                               | <input type="checkbox"/> <b>SL</b> Sierra Leone .....                              |
| <input type="checkbox"/> <b>GE</b> Georgia .....                               | <input type="checkbox"/> <b>TJ</b> Tajikistan .....                                |
| <input type="checkbox"/> <b>GH</b> Ghana .....                                 | <input type="checkbox"/> <b>TM</b> Turkmenistan .....                              |
| <input type="checkbox"/> <b>GM</b> Gambia .....                                | <input type="checkbox"/> <b>TR</b> Turkey .....                                    |
| <input type="checkbox"/> <b>HR</b> Croatia .....                               | <input type="checkbox"/> <b>TT</b> Trinidad and Tobago .....                       |
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| <input checked="" type="checkbox"/> <b>ID</b> Indonesia .....                  | <input type="checkbox"/> <b>UG</b> Uganda .....                                    |
| <input type="checkbox"/> <b>IL</b> Israel .....                                | <input checked="" type="checkbox"/> <b>US</b> United States of America .....       |
| <input type="checkbox"/> <b>IN</b> India .....                                 | <input type="checkbox"/> <b>UZ</b> Uzbekistan .....                                |
| <input type="checkbox"/> <b>IS</b> Iceland .....                               | <input type="checkbox"/> <b>VN</b> Viet Nam .....                                  |
| <input type="checkbox"/> <b>JP</b> Japan .....                                 | <input type="checkbox"/> <b>YU</b> Yugoslavia .....                                |
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| <input type="checkbox"/> <b>KG</b> Kyrgyzstan .....                            |  |
| <input type="checkbox"/> <b>KP</b> Democratic People's Republic of Korea ..... |  |
| <input type="checkbox"/> <b>KR</b> Republic of Korea .....                     |  |
| <input type="checkbox"/> <b>KZ</b> Kazakhstan .....                            |  |
| <input type="checkbox"/> <b>LC</b> Saint Lucia .....                           |  |
| <input type="checkbox"/> <b>LK</b> Sri Lanka .....                             |  |
| <input type="checkbox"/> <b>LR</b> Liberia .....                               |  |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ .....
- ☐ .....
- ☐ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

<b>Box No. VI PRIORITY CLAIMS</b>		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 9 July 1998 (9.7.1998)	981578	FI	.	
item (2)				
item (3)				

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### Box No. VII INTERNATIONAL SEARCHING AUTHORITY

**Choice of International Searching Authority (ISA)**  
(if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

ISA / SE

**Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):**

Date (day/month/year)

Number

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### Box No. VIII CHECK LIST; LANGUAGE OF FILING

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abstract : 1

drawings : 7

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## MENETELMÄ JA LAITTEISTO HAKKEEN SEULONNASSA

Tämän keksintö koskee puuhakkeen seulontaa ja siinä erityisesti tikkujakeen poistamista ja annostelua takaisin prosessiin.

5 Hakkeen seulonnassa pyritään poistamaan sellun valmistusprosessille haitalliset määrät pienjakeita ja suurjakeita. Suurjakeet (ylisuuri ja ylipaksu jae) useimmiten käsitellään seulonnassa esim. tikkuhakulla pienemmiksi partikkeleiksi tai murskataan hake telapuristimella prosessiin paremmin soveltuvaksi. Hienoin jae (puru) on useimmille prosesseille haitallista ja se pyritään poistamaan mahdollisimman hyvin. Seuraavaksi suurempi jae, ns.  
10 tikkujae on sinällään kohtuullisen hyvää raaka-ainetta kuitumielessä, mutta eräissä prosesseissa, kuten esimerkiksi jatkuvatoimisissa keittimissä, se suurina pitoisuuksina on haitallista, koska se voi aiheuttaa häiriöitä prosessin toiminnan kannalta (esim. tukoksia).

Tikkujakeen poistoon käytetään samanlaisia laitteita, kuin purun poistoon, kuten esim. tasoseuloja, täryseuloja, rullaseuloja, kiekoseuloja jne., huomioiden kuitenkin isomman  
15 partikkelikoon aiheuttamat muutokset varsinaisissa seulontaelementeissä. Tunnettuja seulontalaitteita on kuvattu esim. FI-patenttijulkaisuissa 79251 ja 90019. Jos jatkoprosessi (kemiallinen tai mekaaninen sellun valmistusprosessi) on vaativa tikkujakeen maksimimäärän suhteen ja syötettävässä materiaalissa voi esiintyä suuriakin tikkupitoisuuksia, niin tällöin seulotaan usein tikkujae erilleen ja varastoidaan omaan  
20 siiloon, mistä sitä annostellaan vakiosuhteella jatkoprosessiin menevään hyväksytyn hakkeen joukkoon. Laitteistot sinällään kyseiseen tarkoitukseen ovat varmatoimisia, mutta taloudellisesti on kyseessä varsin kalliista lisäinvestoinnista.

Tämän keksinnön mukaisen menetelmän ja laitteiston tunnusmerkit on esitetty patenttivaatimuksissa 1 ja 6.

25 Yleensä seulontaan tulevassa hakkeessa tikkujakeen määrä on keskimäärin sallittua suurempi varsinkin käytettäessä sahoilta ostettua haketta. Tämän keksinnön mukaisella menetelmällä päästään samaan lopputulokseen oleellisesti pienemmillä investoinneilla. Seulonnassa erotetaan tikkujae erilleen, mutta siitä annostellaan takaisin välittömästi enintään halutun suuruinen määrä prosessiin menevän hakkeen joukkoon. Käytettäessä keksinnön  
30 mukaisessa menetelmää vältetään siten tikkuhakkeen välivarastointi, jolloin tikkusiiloa oheislaitteineen ei tarvita ja seulonta voidaan optimoida.

Keksintöä ja sen yksityiskohtia selostetaan lähemmin seuraavassa viitaten oheisiin piirustuksiin, joissa

kuvio 1 esittää perinteistä tikkujakeen erottelua ja annostelua tasoseulonnassa,

kuvio 2 esittää tikkujakeen erottelu- ja annostelumenetelmää paksuusseulonnassa,

5 kuvio 3 esittää keksinnön mukaista tikkujakeen erottelu- ja annostelumenetelmää tasoseulonnan yhteydessä,

kuvio 4 esittää keksinnön mukaista tikkujakeen erottelu- ja annostelumenetelmää paksuusseulonnassa,

10 kuvio 5 esittää periaatekuvaa keksinnön mukaisesta tikkujakeen annostelusta loke-rosyöttimellä,

kuvio 6 esittää annosteluruuvia ja

kuvio 7 esittää kolakuljettimen käyttöä annosteluun.

Kuviossa 1 on esitetty seulontajärjestelmä tikkumaisen hakejakeen erottamiseksi ja uudelleen annostelemiseksi siten, että tikkujakeen määrä pysyy vakiona jatkoprosessiin menevässä hakkeessa. Tasoseula 1 jakaa syötteensä 2 neljään eri osaan. Suurjake 3 johdetaan tikkuhakkuun, josta se haketuksen jälkeen palautetaan ilmanerotussyklonin 5 kautta takaisin seulalle 1. Hyväksytyn kokoinen hake 6 johdetaan jatkoprosessiin 7. Hienoin aines eli purut 8 johdetaan yleensä polttoon. Tikkumainen jake 9 johdetaan tikkusiiloon 10, josta se annostellaan halutun kokoisena virtana 11 takaisin jatkoprosessiin 20 7. Tikkusiilon 10 täytyessä tikut puretaan siilosta esimerkiksi purun 12 joukkoon poltettavaksi.

Kuviossa 2 on esitetty eräs paksuusseulontajärjestelmä, jossa suurjake 3 eli ensimmäisen paksuusseulan 13 ylite johdetaan telapuristimelle 14. Telapuristimella käsitelty hake 15 menee suoraan jatkoprosessiin 7. Paksuusseulan loppuosan lävistäneet hakepalaset 16 menevät suoraan jatkoprosessiin. Alkuosan lävistäneet 17 tippuvat puruseulalle 18. Puruseulan lävistänyt hake 8 on purua ja menee polttoon. Puruseulan ylite on tikkujake 9, joka johdetaan tikkusiiloon ja käsitellään kuten kuviossa 1.

Kuviossa 3 on esitetty keksinnön mukainen tikkujakeen annostelumenetelmä tasoseulonnan yhteydessä. Tikkujake 9 johdetaan seulalta suoraan annostelijalle 19, joka annostelee 30 jatkoprosessiin vain tietyn määrän tikkujake 20. Ylimäärän 21 annostelija 19 johtaa purun 8 joukkoon. Vaihtoehtoisesti ylimäärä 21 kuljetetaan ulos seulomosta, mistä se voidaan



viedä esim. uudelleen hakevarastoon (jos kyseessä on vain ajoittaiset hakelaadun vaihtelut) tai erilliseen purukeittoon, minne kyseinen tikkujae soveltuu erinomaisesti.

Keksinnön mukainen tikkujakeen annostelumenetelmä on kuviossa 4 sijoitettu pak-  
suusseulontajärjestelmään. Puruseulalta 18 tuleva tikkuhake 9 johdetaan annostelijalle 19',  
5 jonka tässä muodostaa kaksi ruuvikuljetinta. Annostelijan 19' toiminta vastaa kuvion 3  
yhteydessä esitettyä.

Kyseinen annostelu voidaan tehdä monen tyyppisillä laitteilla, mitkä tietyllä nopeudel-  
la syöttävät vain tietyn kapasiteetin tikkujacketta hyväksytyn jakeen joukkoon ja ylimäärä  
menee halutusti purun joukkoon tai ulos seulonnasta. Oleellista on säätää annostelevalla  
10 laitteella haluttu annostelumäärä. Ohessa on kuvattu muutamia tavallisimpia menetelmiä  
suorittaa annostelua. Esimerkiksi ns. lokerosyöttimessä tikkujae johdetaan lokerosyöttimen  
19 syöttösuisteeseen 22 (kuvio 5). Lokeroiden 23 koolla ja roottorin 24 pyörimisnopeudel-  
la voidaan asettaa jatkoprosessiin menevä tikkumäärä 20 halutuksi. Ylimäärä 21 tikkujae-  
keesta putoaa syöttösuisteen 22 alemman reunan 25 ylitse.

15 Vastaavasti annostelu voidaan tehdä esimerkiksi kahdella ruuvikuljettimella (kuvio 6),  
missä alemmalla ruuvikuljettimella 26 saadaan kierroslukua säätämällä otettua haluttu  
määrä tikkujacketta 20 ulos. Ylimäärän 21 ylempi ruuvikuljetin 27 kuljettaa erilliseen pur-  
kausaukkoon 30, josta ylimäärä johdetaan esimerkiksi purun joukkoon. Annostelu voidaan  
tehdä myös kolakuljettimilla (kuvio 7), jossa esimerkiksi alemman kolakuljettimen 28 no-  
20 peutta säätämällä vaikutetaan jatkoprosessiin menevän tikkujakeen 20 määrään. Kolakul-  
jettimen 29 alle voidaan laittaa myös ruuvikuljetin, jolloin se toimii kuten kuviossa 6.

Jos seulontaan tulevan syötteen kapasiteetti on vaihteleva, voidaan mitata seulontaan  
tuleva tai sieltä lähtevä hakemäärä, jolloin vastaavasti voidaan säätää jatkoprosessiin mene-  
vän tikkujakeen määrää. Tällöin tikkujakeen suhde jatkoprosessiin menevään hakkeen  
25 kokonaismäärään nähden pysyy jatkuvasti vakiona. Jos seulomoa syötetään vakiokapasi-  
teetilla, niin tikkujakeen annostelumäärä voidaan pitää vakiona.

Termi "tikkujae" on määritelty esim. standardissa SCAN-CM 40:94.

### Patenttivaatimukset

1. Menetelmä puuhakkeen seulonnassa, jossa tikkujae (9) erotellaan muusta hakkeesta ja annostellaan jatkoprosessiin (7) menevän hakkeen joukkoon siten, että tikkujakeen (9) osuus suhteessa kokonaishakemäärään (7) ei ylitä haluttua arvoa, **tunnettu** siitä, että seulonnassa eroteltua tikkujaetta johdetaan haluttu määrä (20) seulonnan jälkeen jatkoprosessiin (7) menevän hakkeen joukkoon ilman välivarastointia.

2. Patenttivaatimuksen 1 mukainen hakkeen seulontamenetelmä, **tunnettu** siitä, että jatkoprosessiin (7) menevän hakkeen joukkoon johdettava tikkumäärä (20) määritellään annosteluvälineen (19, 19', 26, 28) avulla.

10 3. Patenttivaatimuksen 1 mukainen hakkeen seulontamenetelmä, **tunnettu** siitä, että jatkoprosessiin (7) menevän hakkeen joukkoon johdettava tikkumäärä (20) määritellään mittaamalla seulontaan tuleva hakemäärä (2).

15 4. Patenttivaatimuksen 1 mukainen hakkeen seulontamenetelmä, **tunnettu** siitä, että jatkoprosessiin menevän hakkeen joukkoon annosteltava tikkumäärä (20) määritellään mittaamalla seulonnasta jatkoprosessiin (7) menevä hakemäärä.

5. Jonkin patenttivaatimuksen 1 - 4 mukainen hakkeen seulontamenetelmä, **tunnettu** siitä, että halutun määrän (20) ylittävä tikkujaeosuus (21) ohjataan purun joukkoon tai seulontaa edeltävään hakevarastoon tai erilliseen tikkuvarastoon.

20 6. Laitteisto puuhakkeen seulomiseksi ja ohjaamiseksi jatkoprosessiin (7), jossa laitteistossa on yksi tai useampia seulontalaitteita (1, 18) ja välineet tikkujakeen (9) annostelemiseksi jatkoprosessiin menevän hakkeen (7) joukkoon, **tunnettu** siitä, että välineet (19, 19', 26, 28) tikkujakeen (9) annostelemiseksi jatkoprosessiin (7) menevän hakkeen joukkoon on sovitettu välittömästi seulontalaitteiden (1, 18) tai niiltä tulevien kuljettimien (27, 29) jälkeen.

**Tiivistelmä**

Menetelmä ja laitteisto hakkeen seulonnassa, jossa tikkujae (9) erotellaan muusta hakkeesta ja annostellaan jatkoprosessiin (7) menevän hakkeen joukkoon siten, että tikkujakeen (9) osuus suhteessa kokonaishakemäärään (7) ei ylitä haluttua arvoa. Tikkujaetta annostellaan haluttu määrä (20) seulonnan jälkeen jatkoprosessiin (7) menevän hakkeen joukkoon ilman välivarastointia.

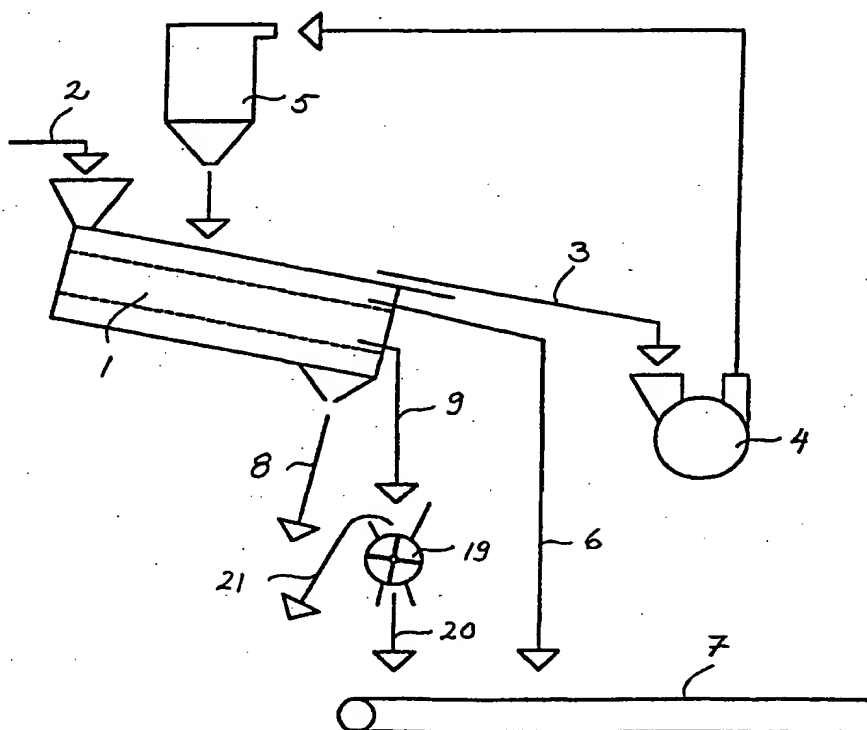
(Fig. 3)

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/FI99/00569 <b>(22) International Filing Date:</b> 28 June 1999 (28.06.99)  <b>(30) Priority Data:</b> 981578                      9 July 1998 (09.07.98)                      FI  <b>(71) Applicant (for all designated States except US):</b> SUNDS DEFIBRATOR WOODHANDLING OY [FI/FI]; PL 210, FIN-28101 Pori (FI).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> <u>TÄHKÄNEN</u> , Hannu [FI/FI]; Vinkkelikuja 32, FIN-26660 Rauma (FI).  <b>(74) Agent:</b> RUSKA & CO OY; Runeberginkatu 5 A, FIN-00100 Helsinki (FI).		<b>(81) Designated States:</b> CA, ID, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> With international search report. In English translation (filed in Finnish).

**(54) Title:** A CHIP SCREENING METHOD AND PLANT**(57) Abstract**

A chip screening method and plant wherein the pin chips (9) are separated from the rest of the chips and dosed among chips that are to be led to a subsequent process (7) so that the share of the pin chips (9) relative to the total amount of chips (7) does not exceed a desired value. After the screening process, a desired amount of pin chips (20) is dosed among the chips that are to be led to a subsequent process (7) without intermediate storage.



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## A CHIP SCREENING METHOD AND PLANT

This invention relates to the screening of wood chips and, especially, to the removal of the pin chips and to the dosing of them back into the process.

5 The objective of the chip screening is to free the chips from such shares of small-size and large-size fractions that could have a detrimental effect on the pulp making process. In the screening process, the large-size fractions (too big and too thick chips) are usually treated by means of a rechipper, for example, into smaller particles or crushed by means of a roller  
10 press into a form more suitable for the process. The finest fraction (the sawdust) causes problems in most processes, which is why every effort is made to purify the chips from it as well as possible. The next biggest fraction, the so-called pin chips, as such, constitutes quite a good raw material in terms of fibres, but a high content of pin chips is disadvantageous to some processes, e.g. to continuously operating digesters, as it may  
15 cause malfunctions in the process (e.g. blocks).

For the removal of pin chips, the same kind of devices are used as for the removal of sawdust, i.e. flat screens, vibrating screens, roll screens, disc screens and so forth. To the screening elements themselves, however, changes are made because of the larger particle  
20 size. Screening plants known in the prior art are described, for example, in Finnish patent specifications 79251 and 90019. If the subsequent process (a chemical or a mechanical pulp making process) sets strict restrictions on the maximal amount of pin chips, and if it is possible that the pin content of the material to be fed is high, the pin chips are usually separated by screening and stored in a separate bin. Then, the pin chips are dosed into the  
25 accepted fraction fed to the subsequent process, using a constant ratio. The plants designed for this purpose are reliable as such but represent, from an economical point of view, a considerable extra investment.

30 The characteristics of the method and the plant according to the present invention are set forth in claims 1 and 6.

On an average, the amount of pin chips among the chips to be screened is usually larger than the allowable amount, especially when the chips are bought from sawmills. The method according to the invention provides the same result at substantially lower costs. The pin chips are separated in the screening process but a maximum desired amount is dosed back among the chips due for the process immediately after the separation. Thus, no intermediate storage of the pin chips, and, consequently, no pin bin with auxiliary devices are needed in the method according to the invention. The screening can be optimised.

The invention and the details thereof will now be described in more detail with reference to the following drawings wherein

figure 1 shows the traditional way of separating and dosing pin chips using a flat screen, figure 2 shows a method of separating and dosing pin chips in connection with thickness screening,

figure 3 shows the method of separating and dosing pin chips according to the invention using a flat screen,

figure 4 shows the method of separating and dosing pin chips according to the invention in connection with thickness screening,

figure 5 shows the principles of the pin chip dosing method according to the invention in connection with a sectional feeder,

figure 6 shows a dosing screw and

figure 7 shows the use of a scraper conveyor for the dosing.

Figure 1 shows a screening system for separating pin chips and for re-dosing them so that the amount of pin chips among the chips that are to be led to the subsequent process remains constant. A flat screen 1 divides the input 2 into four parts. The large-size fraction 3 is led to a rechipper from which, once the re-chipping has been completed, it is conducted back to screen 1 via an air separating cyclone 5. The accepted fraction 6 is led to the subsequent process 7. The finest material 8, i.e. the sawdust, is usually led to a burning process. The pin chips 9 are conducted into a pin bin 10 from which a pin chip flow 11 of desired size is dosed back into the subsequent process 7. When the pin bin 10 becomes full, the pins are discharged from the bin among the sawdust 12, for example, to be burned.

In figure 2 is shown a thickness screening system wherein the large-size fraction 3, i.e. the chips that have crossed the first thickness screen 13, is led to a roller press 14. The chips 15 treated by the roller press are led directly to the subsequent process 7. The chips 16 that have penetrated the end part of the thickness screen are led directly to the subsequent process. The chips 17 that have penetrated the front part fall onto a sawdust screen 18. The particles 8 that have penetrated the sawdust screen are sawdust and are led to a burning process. The chips that have crossed the sawdust screen are pin chips 9 that are led into a pin bin and treated in the same way as in figure 1.

Figure 3 shows the pin chip dosing method according to the invention in connection with a flat screen. The pin chips 9 are led from the screen directly to a dosing apparatus 19 that doses only a certain amount 20 of pin chips into the subsequent process. The dosing apparatus 19 leads the surplus 21 of the pin chips among the sawdust 8. Alternatively, the surplus 21 of the pin chips is transported away from the screening plant, back to the chip pile, for example (if the variation in chip quality is only temporary), or, to a separate sawdust digesting process, for which the relevant pin fraction is excellent.

In figure 4, the pin chip dosing method according to the invention is used in a thickness screening system. Pin chips 9 coming from a sawdust screen 18 are led to a dosing apparatus 19' which, in this case, is constituted by two screw conveyors. The dosing apparatus 19' operates in the same way as the dosing apparatus shown in figure 3.

Said dosing can be performed by means of many kinds of devices that feed only a certain amount of pin chips among the accepted chips at a certain rate. The rest of the pin chips are led among the sawdust or away from the screening process, as desired. It is essential that the dosing apparatus is set for dosing the appropriate chip amount. Some of the most common ways of performing this kind of dosing are described in the following. In a so-called sectional feeder, for example, the pin chips are led into the feeding chute 22 of the sectional feeder 19 (figure 5). The dosing apparatus can be set to dose a desired amount 20 of pins into the subsequent process by adjusting the size of the sections 23 and the rate of



rotation of the rotor 24. The rest 21 of the pin chips fall over the lower edge 25 of the feeding chute 22.

Correspondingly, dosing can be performed for example by means of two screw conveyors (figure 6). A desired amount of pin chips 20 is extracted by means of adjusting the speed of rotation of the lower screw conveyor 26. The upper screw conveyor 27 transports the rest 21 of the pin chips to a separate discharge opening 30 from which they are conducted, for example, among the sawdust. Dosing can be also performed by means of a scraper conveyor (figure 7), for example by adjusting the rate of speed of the lower scraper conveyor 28 to control the amount of pin chips 20 led into the subsequent process. It is also possible to place a screw conveyor under the scraper conveyor 29, to operate according to figure 6.

If the input of the screening process varies in quantity, the input or the output of the screening process can be measured and, correspondingly, the amount of pin chips led to the subsequent process can be adjusted. Thus, the ratio of the pin chips to the total amount of chips led to the subsequent process remains constant all the time. If the input of screening plant is constant, a constant amount of pin chips can be dosed.

The term "pin chip" is defined, for example, in standard SCAN-CM 40:94.

## Claims

1. A wood chip screening method wherein the pin chips (9) are separated from the rest of the chips and dosed among chips that are to be led to a subsequent process (7) so that the share of the pin chips (9) relative to the total amount of chips (7) does not exceed a desired value, **characterised** in that a desired amount (20) of the pin chips separated in the screening process, once the screening process has been completed, is led among the chips that are to be led to the subsequent process (7) without intermediate storage.
2. A chip screening method as defined in claim 1, **characterised** in that the amount of pin chips (20) led among the chips that are to be led to the subsequent process (7) is defined by means of a dosing apparatus (19, 19', 26, 28).
3. A chip screening method as defined in claim 1, **characterised** in that the amount of pin chips (20) led among the chips that are to be led to the subsequent process (7) is defined by measuring the amount of chips (2) fed into the screening process.
4. A chip screening method as defined in claim 1, **characterised** in that the amount of pin chips (20) dosed among the chips that are to be led to the subsequent process is defined by measuring the amount of chips fed into the subsequent process (7) from the screening process.
5. A chip screening method as defined in any one of claims 1 to 4, **characterised** in that the amount of pin chips (21) exceeding the desired amount (20) is led among the sawdust or to the chip pile preceding the screening process or to a separate pin pile.
6. A plant for screening wood chips and for leading them to a subsequent process (7), which plant comprises one or more screening devices (1, 18) and means for dosing the pin chips (9) among chips (7) that are to be led to the subsequent process, **characterised** in that the means (19, 19', 26, 28) for dosing the pin chips (9) among the chips (7) that are to be led to the subsequent process are placed immediately after the screening devices (1, 18) or the conveyors (27, 29) coming therefrom.

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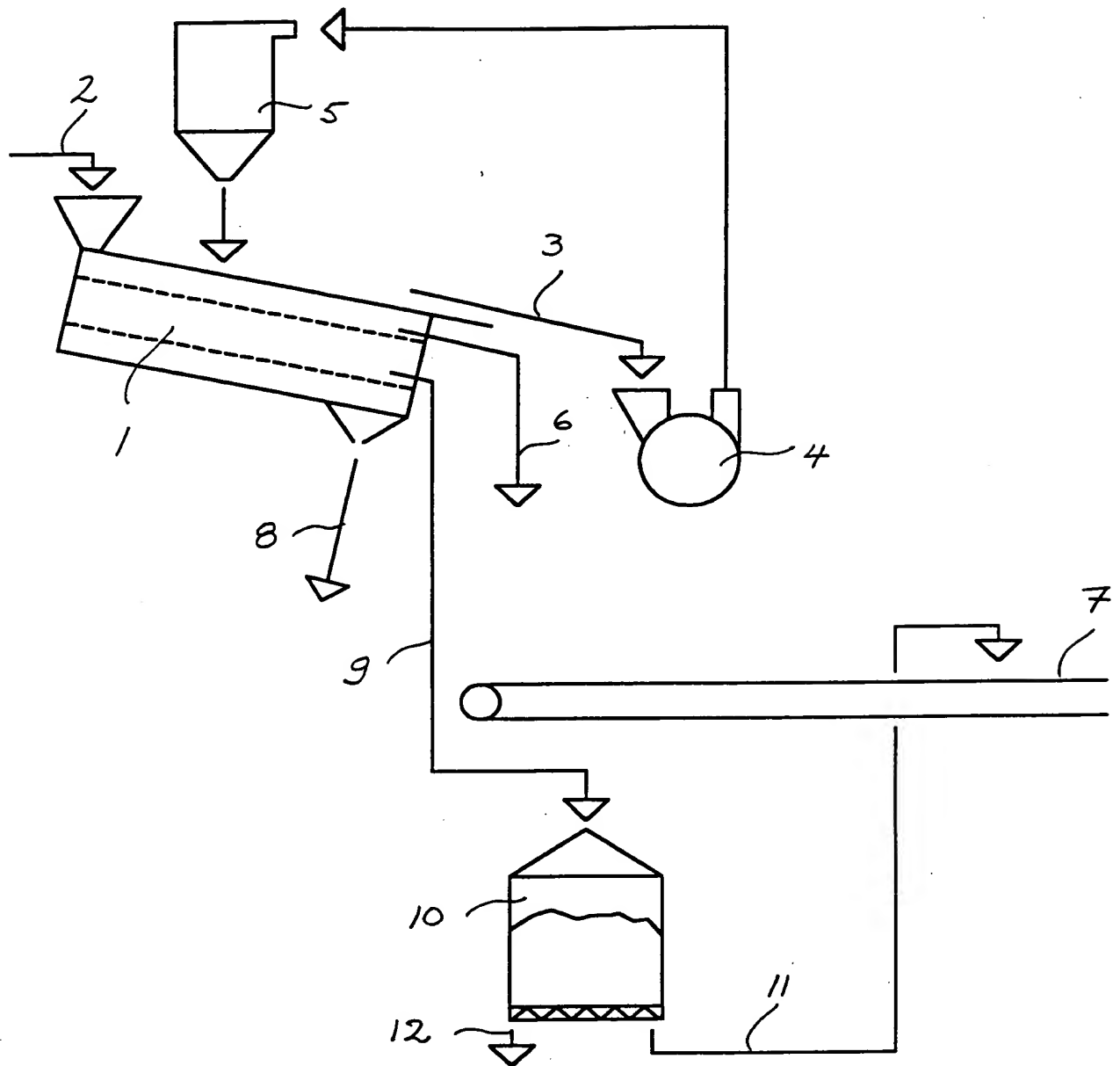


Fig. 1

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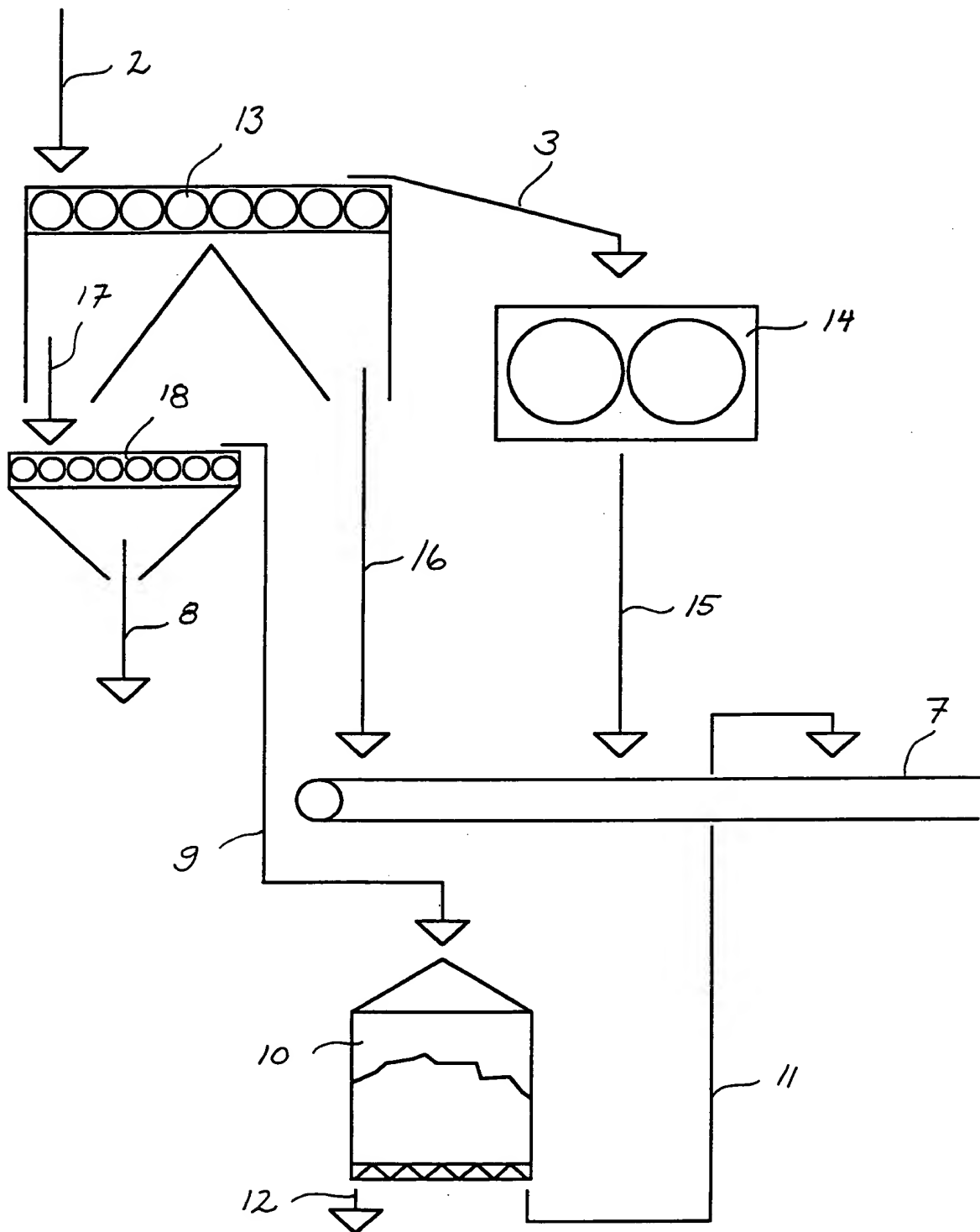


Fig. 2

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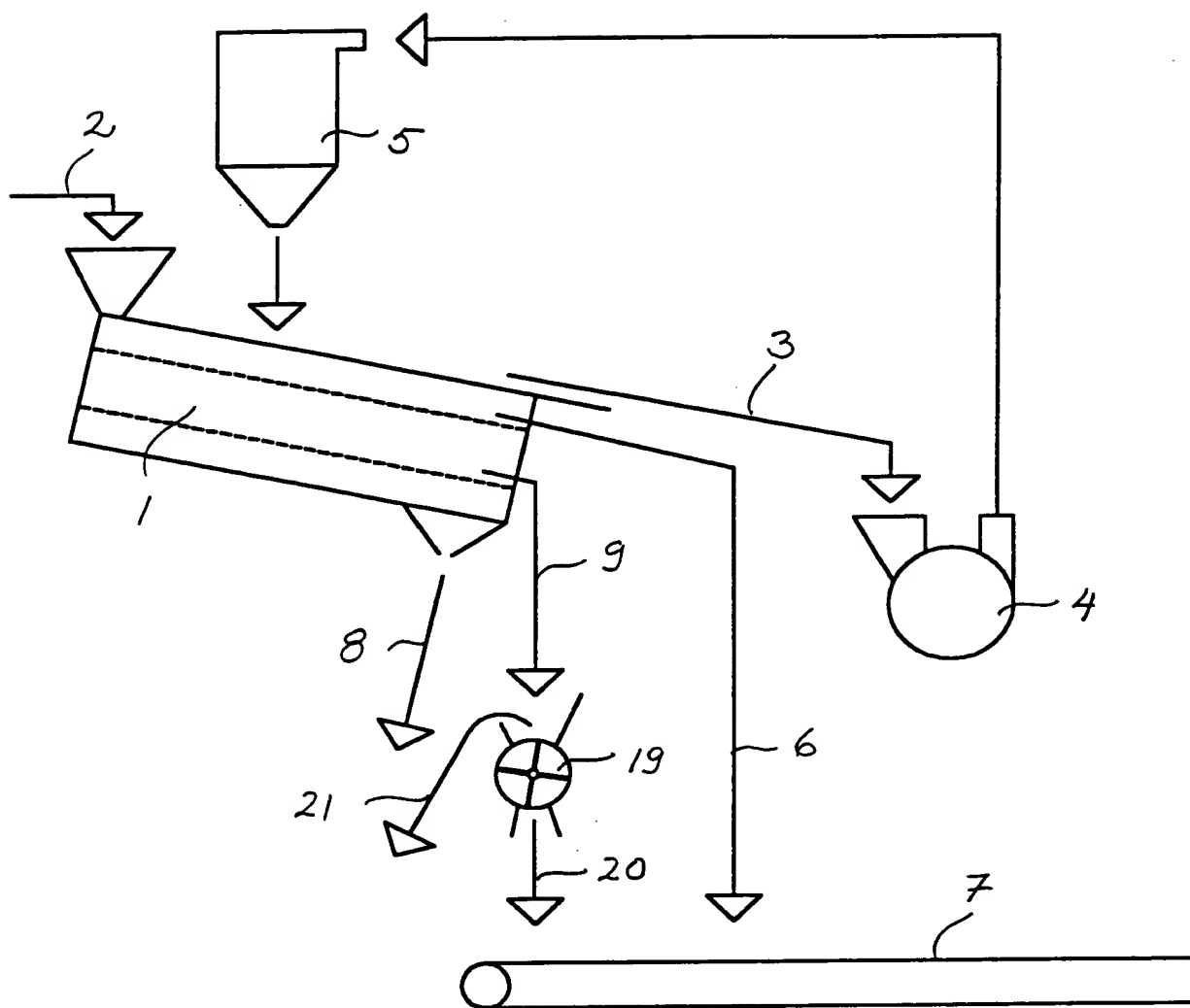


Fig. 3

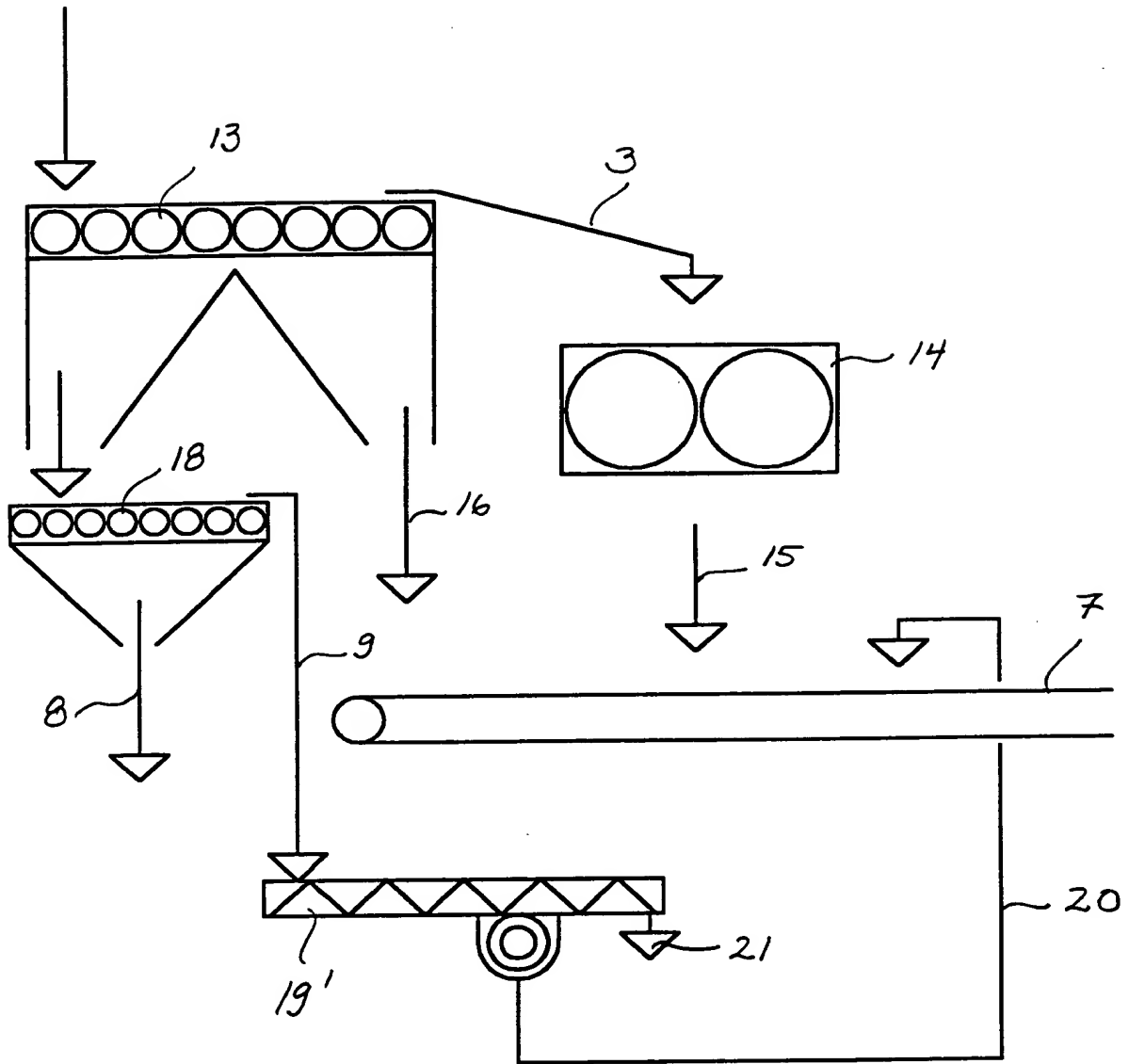


Fig. 4

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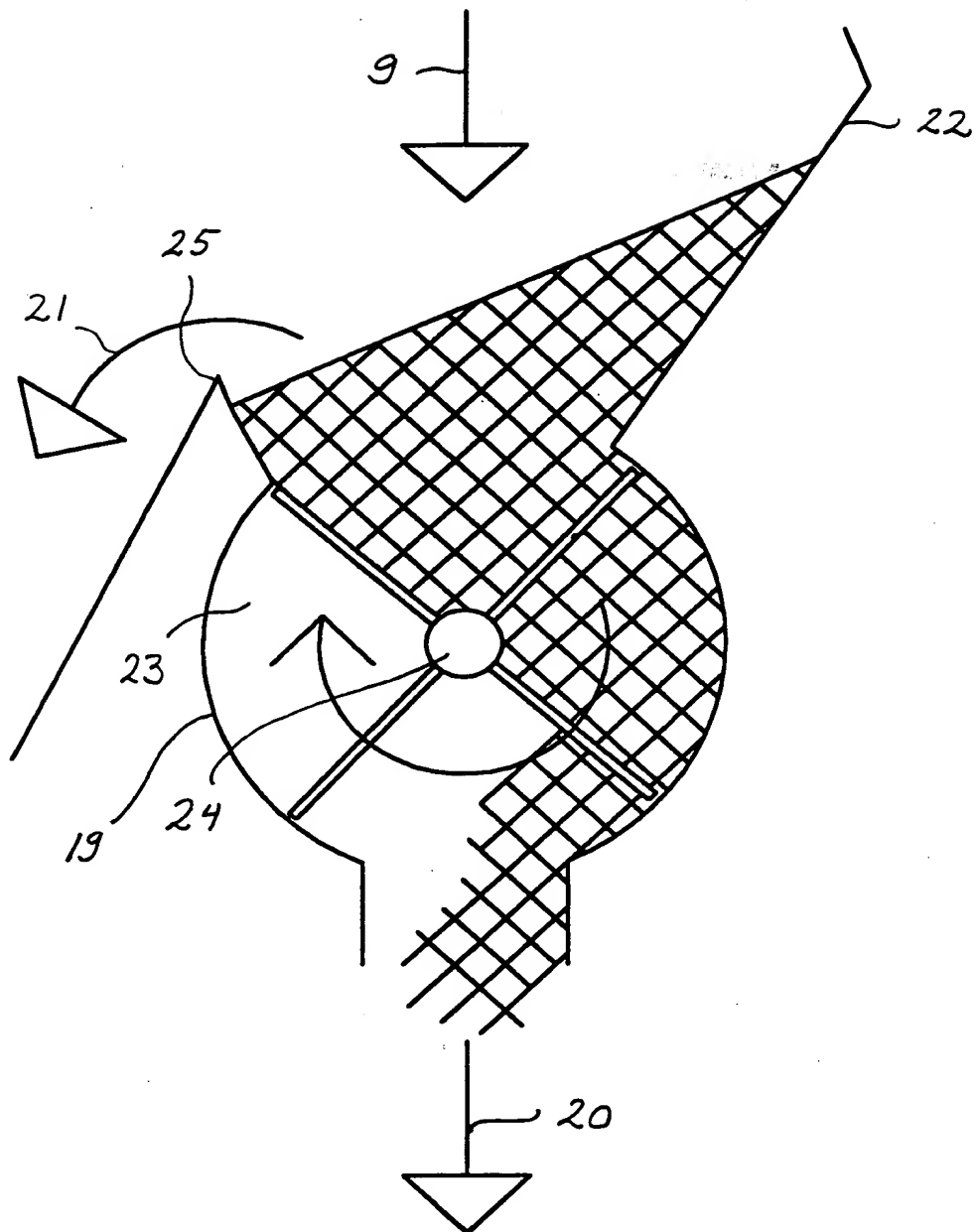
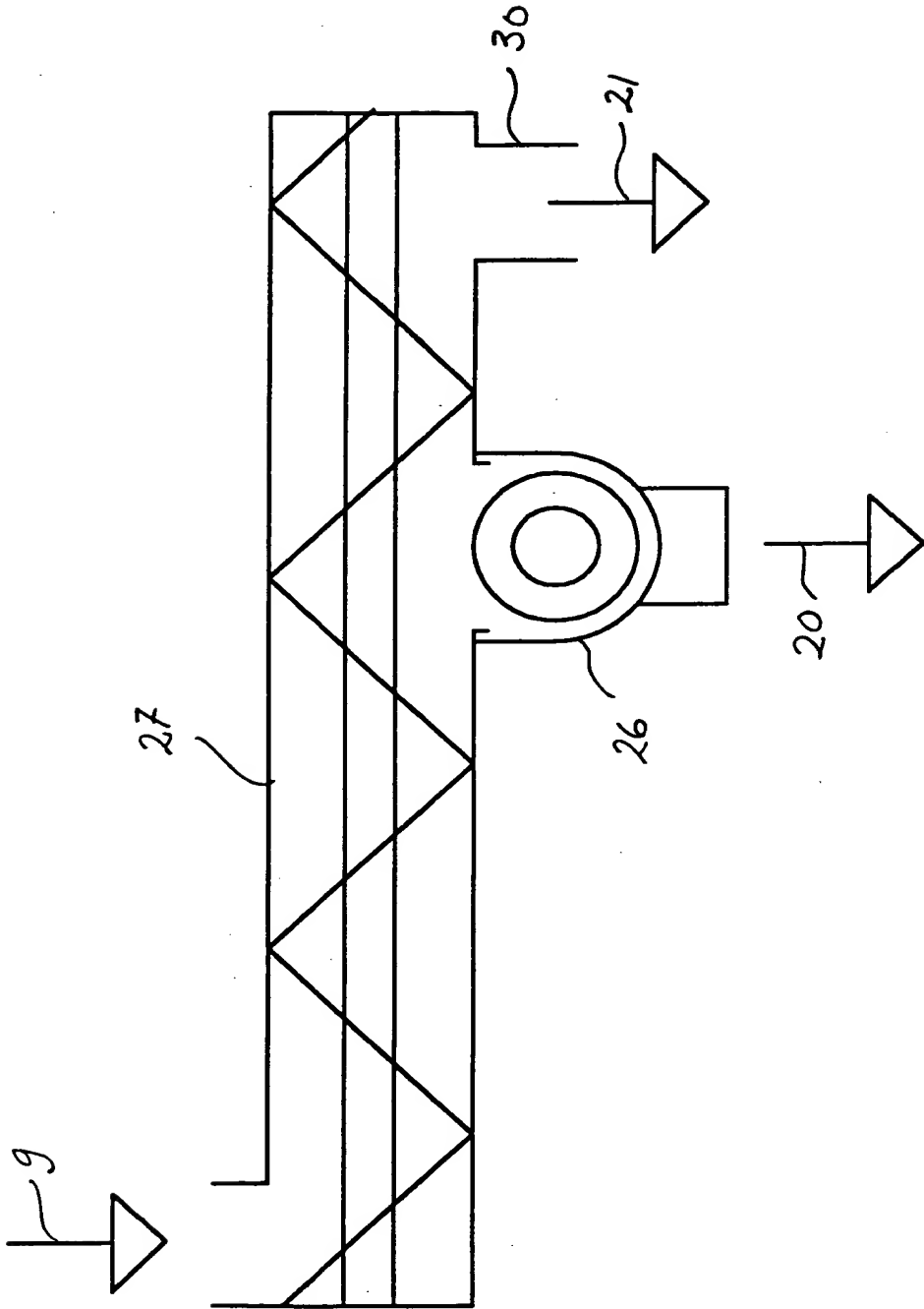


Fig. 5





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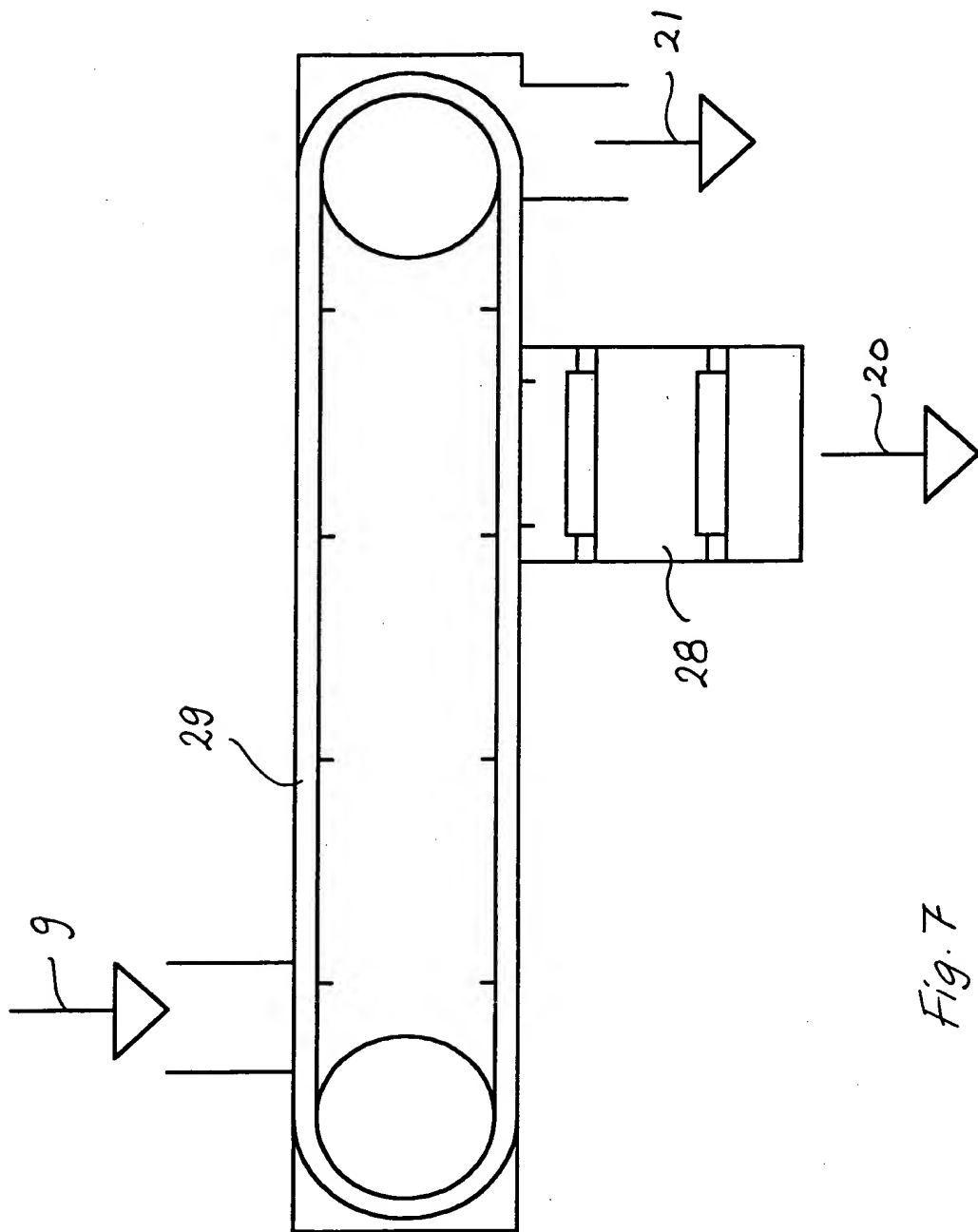


Fig. 7